NOTES

THE French Government has formally decided to accept the principle of obligatory primary instruction. M. Waddington proposes, moreover, to organise four great Universities in France, viz., at Paris, Lyons, Bordeaux, and Nancy, each of which will have an independent status. M. Waddington's legislation is entirely in accordance with the views which have been so frequently advocated in NATURE. The sooner that similar reforms are universally made the better it will be for the advance of solid education. The tendency, we are glad to think, to follow the German example, is spreading, and we hope it will soon reach our own country. Such institutions as Owens College, the Yorkshire College, and other similar bodies, cannot too soon spring into universities with the vigour of youth. The admirable vigour and promptness with which the French Government has carried out the much needed educational reform is in the highest degree hopeful.

ACCORDING to the photographs taken daily at Montmartre by M. Janssen, no spots have been now noticed on the sun since March 25. At the last meeting of the Paris Academy, M. Leverrier announced that in addition to the solar work to be carried on by M. Janssen in the new physical observatory of Paris, M. Cornu has been appointed to make corresponding researches in the National Observatory. It is extremely encouraging to witness astronomical research taken up with such vigour by France as well as by Germany.

WE regret to have to record the loss of one of the most indefatigable of our working naturalists in the death of Mr. Edward Newman, which took place on the 12th inst. at his residence at Peckham at the age of 75. Mr. Newman took up the study of natural history when a young man, as a relaxation from the labours of an active commercial life, and continued ardently devoted to it to the close of his life. He soon established himself as an authority in two branches especially, entomology and pteridology. His "Grammar of Entomology" was published as long ago as 1835; and his "British Ferns" still holds its place, notwithstanding a tendency to excessive species-splitting, as a standard manual of the ferns of these islands. He was the editor of the *Zoologist* and *Entomologist*, as well as of the *Phytologist*, which has ceased to appear for some years; and he was a large contributor to periodical literature, having had the control of the natural history department of the *Field*. Mr. Newman was a Fellow of the Linnean and Zoological Societies, and of several foreign academies, and has been president of the Entomological Society.

THE friends and admirers of the late Daniel Hanbury will be glad to learn that a selection from his papers and essays, with a memoir by Mr. Thomas Ince, F.L.S., is now in the press and will be ready for publication in a few days. The book will consist chiefly of papers on Pharmacology and Botany, and will be illustrated by a portrait engraved on steel and by a number of wood engravings and lithographs. Messrs. Macmillan and Co. are the publishers.

IN addition to the ordinary courses of lectures for science students at South Kensington this year, the Lords of the Committee of Council on Education are making arrangements for a course of sixty lectures on the scientific instruments in the Loan Collection. Their Lordships are in communication with the leading men of science in the country to enable them to carry out the important object they have in view.

ACCORDING to tidings which have been received at Berlin from the German expedition under Dr. Finsch, now exploring Western Siberia, it appears that the expedition left Tyumen on April 13, and proceeded to Omsk. From thence the explorers followed the course of the River Irtish across the steppes as far as Semipalatinsk, where the Russian Governor gave them a very hospitable reception. The travellers made their next halt at a Khirgiz *yourt*. From thence they were at the time of writing about to undertake an expedition into the mountains on the Chinese border. In the second half of the present month the explorers hoped to reach Bernaul, after which it was their intention to follow the course of the river Ob downwards. Dr. Finsch's letters are stated to contain some very instructive and interesting intelligence on animal and vegetable life in the regions traversed. The other expedition undertaken specially to explore the mouth of the river Ob started from Moscow on May 11. The two expeditions are to join at the mouth of the Ob and to return to Germany in company. They are expected back in the course of the autumn.

DR. W. PETERS has lately communicated to the Royal Academy of Sciences of Berlin a description of a very fine new species of wild sheep which is found in Eastern Mongolia, north of Pekin. Dr. O. von Moellendorff, of the Imperial German Legation at Pekin, has forwarded to the Zoological Museum of Berlin an adult male specimen of this animal, which Dr. Peters proposes to call *Ovis jubata*, from the long hairs which adorn its chest.

AT the meeting of the Zoological Society on Tuesday last, Mr. H. E. Dresser, F.Z.S., exhibited a series of specimens of a very fine new species of Snow Partridge, collected by Mr. C. G. Durnford in the Taurus Mountains, and described it under the name of *Tetraogallus tauricus*. This bird, which seems to be restricted to the Taurus range, where it inhabits the higher and more inaccessible mountains, is nearest allied to *Tetraogallus caspius*, but differs in being much larger, in having the upper parts much paler and washed with buff, the hinder portions of the neck and the fore-parts of the back ashy buff, almost unverunculated, a broad pectoral band of ashy buff spotted with black; the flank feathers clear blue grey in the centre, with a chestnut stripe on each side, and an outside margin of black; and the lower breast, instead of being broadly marked with black, is ashy buff, finely verunculated with blackish grey. This makes the fifth species of Snow Partridge now known to inhabit different parts of the Palæarctic region, the others being *T. caspius*, from the Caucasus, *T. himalayensis*, from the Himalayas, *T. altaicus*, from the Altai range, and *T. tibetanus*, from Thibet. Mr. Dresser also exhibited and described, under the name of *Limicola sibirica*, a new species of broad-billed Sand-piper from China, which differs from *L. platyrhyncha* in having the upper parts rich rufous, as in *Tringa minuta*, instead of deep blackish brown, as in the former species.

THERE are now living in the Zoological Society's Gardens, Regent's Park, four specimens of the Giant Tortoises of the Galapagos Archipelago, two having been brought home by the *Challenger*, and deposited by Prof. Wyville Thomson, and two by Commander W. E. de Cookson, of H.M.S. *Peterel*. They were all obtained from Albemarle Island, and are of the species known as *Testudo elephantopus*. These, together with the even larger specimens of *Testudo indica*, from Aldabra, form an unequalled series of living Giant Tortoises.

THE Very Rev. Principal Tulloch, D.D., Vice-Chancellor of the University of St. Andrews, was entertained at dinner on Monday night at St. James's Hall, by a large and influential gathering of the members of the St. Andrews Graduates' Association. Dr. Richardson, F.R.S., Assessor of the General Council in the University Court, presided, and was supported by the Earl of Elgin, Mr. Lyon Playfair, M.P., Dr. Lush, M.P, Sir Joseph Fayrer, K.C.S.I., and a large number of members of the association. The reception given to Principal Tulloch was enthusiastic. The Principal spoke of the past and present of the University with which he is connected. Sir Joseph Fayrer replied for the toast of the University of Edinburgh, and Mr. Danby Seymour eloquently proposed the health of the chairman. It is gratifying to find that this Scottish University is represented by so many eminent men of science in London; we would wish to see the example followed by other Universities.

UNDER the title of "Endowment of Research in America," the *Academy*, at President Gilman's request, gives publicity to the following circular:—"The trustees of the Johns Hopkins University hereby offer to young men from any place ten fellowships, or graduate scholarships to be bestowed for excellence in any of the following subjects:—Philology, literature, history, ethics, and metaphysics, political science, mathematics, engineering, physics, chemistry, natural history. The object of this foundation is to give scholars of promise the opportunity to prosecute further studies, under favourable circumstances, and likewise to open a career for those who propose to follow the pursuit of literature or science. The University expects to be benefited by their presence and influence, and by their occasional services; from among the number it hopes to secure some of its permanent teachers.—*Conditions*:—1. The applications must be made in writing prior to June 1, 1876. The decision of the trustees, will, if possible, be made before July 1. 2. The candidates must give evidence of a liberal education (such as the diploma of a college of good repute); of decided proclivity towards a special line of study (such as an example of some scientific or literary work already performed); and of upright character (such as a testimonial from some instructor). 3. The value of each fellowship will be \$500, payable in three sums, viz.: \$100, Oct. 1; \$200, Jan. 1; \$200, June 1. In case of resignation, promotion, or other withdrawal from the fellowship, payments will be made for the time during which the office may have been actually held. 4. Every holder of a fellowship will be expected to render some services to the institution as an examiner, to give all his influence for the promotion of scholarship and good order—and in general to co-operate in upholding the efficiency of the University, as circumstances may suggest. 5. He will be expected to devote his time to the prosecution of special study (not professional), with the approval of the president, and before the close of the year, to give evidence of progress by the preparation of a thesis, the completion of a research, the delivery of a lecture, or by some other method. 6. He may give instruction, with the approval of the president, by lectures or otherwise, to persons connected with the University, but he may not engage in teaching elsewhere. 7. He may be re-appointed at the end of the year. 8. These regulations are prescribed for the first year only." For further information inquiries may be addressed to D. C. Gilman, president of the Johns Hopkins University.

Iron, on the authority of the Icelandic paper *Nordlingr*, states that two enterprising Icelanders, named Jow Thorkellsson and Sigindur Kraksson, have explored the volcanic region of the Dygyur Jelden. They started on their hazardous expedition from the Bardadal on Feb. 7, and in the course of their two days' exploration they succeeded, under great difficulties and dangers, in descending into the crater of the volcano Asya, where, at about 3,000 feet below the upper margin, they reached the bottom, and found themselves on the brink of a lake of seething hot water, which was apparently of great depth. Near the southern extremity of this lake the ground was broken up by fissures and pools, which prevented further progress in that direction, while the entire space resounded with the noise of loud subterranean thunder. North of the great crater the explorers found an opening about 600 feet wide, which appeared to be of about equal depth, from which issued dense masses of sulphurous smoke, accompanied by loud and deafening sounds.

THE Royal Society gave on Wednesday last week a *conversazione*, to which, for the first time, ladies were invited. The experiment was eminently successful.

THE members of the Birmingham Natural History and Microscopical Society propose to visit on Saturday next the Loan Collection of Scientific Apparatus, the South Kensington authorities having promised to afford them every facility. On the same day, under the guidance of Mr. W. R. Hughes, the members of the Society will visit the Crystal Palace Aquarium.

W. B. LOWE has been elected to a Foundation Scholarship at St. John's College, Cambridge, for proficiency in Natural Science. Houghton, Marr, and Slater to Exhibitions.

AN examination will be held at Exeter College, Oxford, in October next, for the purpose of filling up a Natural Science Scholarship tenable for four years during residence, and of the annual value of 80*l*. There is no limit of age for this Scholarship. The examination will be in biology, chemistry, and physics.

THE Society of Geography of Paris, appointed some time since, a special committee on Commercial Geography. We learn from the *Explorateur* that this Committee is starting a new and independent Geographical Society. We have also received a prospectus announcing the formation of a Paris Society of Zoology.

THE Academy of Zurich has granted a doctorship in Medicine for the first time to a young lady, Miss Francisca Tiburtias, aged 23.

M. W. DE FONVIELLE has had a spectroscope constructed with a graduated screen permitting the quantity of light admitted to be diminished in a known ratio. The moving force being regulated at will, the radiometer can be put in a state of rotation under the rays of the most scorching sun and record taken of the motion very easily. With such an apparatus it was shown by comparison with a standard oil-lamp burning forty-two grammes an hour, that on June 9, at 4 o'clock precisely, the radiating force of the sun was equal to fourteen lamps at a distance of twenty-five centimetres from the axis of the radiometer. The apparatus is tried daily at La Villette gas-works, and results of the comparisons will be tabulated and discussed.

PROF. O. C. MARSH has discovered a new sub-order of Pterosauria from the Upper Cretaceous of Western Kansas, North America, differing from the typical Pterodactyles in that no teeth were present in either jaw. The name given to the genus, *Pteranodon*, signifies this. The species was of large size, the skull of *Pteranadon longiceps* being thirty inches from the occipital crest to the end of the pre-maxilla. It must be remembered that the absence of teeth in a Pterodactyle *need* not lead to the inference that it is any way more nearly related to birds than the tooth-possessing species, because the character may have been acquired quite independently.

THE April number of the *Bulletin* of the French Geographical Society contains a memoir of the late Jules Duval, by M. E. Levasseur, an Account of a Journey in Herzegovina, by M. E. De Sainte-Marie, and Notices of the Basques, by Major V. Derrécagaix.

REINWALD AND CO., of Paris, have just added to their "Bibliothèque des Sciences Contemporaines" a work on Anthropology, by Dr. Paul Topinard, with a Preface by Prof. Paul Broca. Williams and Norgate are the English publishers.

In the *Monthly Notices* of the Royal Society of Tasmania for 1874 occur some interesting abstracts of papers read before the Society, including notices of the Angora goat, some species of Tasmanian birds, introduction of the salmon into Tasmanian waters, the Silurian fossils of Tasmania, the Tertiary basin of Launceston, and a list of the plants of Tasmania, prepared in 1875 by Baron Fred. von Mueller. To the notices are appended the meteorological observations made during the year by Mr. F. Abbott at Hobart Town, and by Mr. W. E. Shoobridge at New Norfolk. From the monthly notes we observe that meteorological observations are also made at Port Arthur, Mount Nelson, King's Island, and other places, and sent to the Society, but the results are not published, nor so far as we are aware have they been published since 1866. We hope the Society may soon be in a position not only to publish these results, but also results from a sufficient number of stations, so as to represent adequately the meteorology of the island.

The additions to the Zoological Society's Gardens during the past week include a Cariama (*Cariama cristata*) from South-east Brazil, presented by Capt. W. C. Chapman, H.M.S. *Dido*; two Black-eared Marmosets (*Hepale penicillata*) from Brazil, presented by Mr. G. Newton; a Rose-ringed Parakeet (*Palæornis docilis*) from West Africa, presented by Mrs. Haywood; a Hyacinthine Maccaw (*Ara hyacinthina*) from Brazil, presented by Mr. H. Wilson; a Moor Monkey (*Semnopithecus maurus*) from Java, a Bay Antelope (*Cephalophus dorsalis*) from West Africa, purchased; two Vulturine Guinea Fowl (*Numida vulturina*) from East Africa, a Puma (*Felis concolor*) from Central America, deposited.

SCIENTIFIC SERIALS

Poggendorff's Annalen der Physik und Chemie, No. 3.—According to the kinetic theory of gases, supposing the gaseous molecule to consist of only one atom, the relation of the two specific heats (as Clausius has shown), would be 1·666. The lower number obtained by experiment for several gases may probably be explained by the complex constitution of their molecules. It seemed desirable to MM. Kundt and Warburg to determine experimentally the specific heat of mercury vapour, which has been considered by chemists to consist of monatomic molecules. Their method was to produce a sound in two glass tubes placed end to end, and containing, the one mercury vapour, the other air. Having introduced powder into the tubes, they observed the distances between the nodes of vibration. Applying a formula of acoustics which comprehends, among other things, the densities, the temperatures, and the relation of the specific heats, and taking, as value of this relation in the case of air, the number 1·405, they obtain, for mercury vapour, the number 1·67, which may be considered as fully in accord with the number 1·666 furnished by theory.—In an interesting paper which follows, M. Colley, of Moscow, examines a particular case of work done by the galvanic current. Suppose a current to pass through a vertical column of some salt, *e.g.* nitrate of silver; both electrodes being in this case of silver. In a given time a certain quantity of silver is liberated and deposited. Now, if the current pass up the column, it lifts this silver against the force of gravity, and so does mechanical work, which, in the opposite case (of the current passing down) is not done. It appeared, then, as theory anticipated, that the downward current in such a column (as measured by the galvanometer), was stronger than the upward, and the difference was not greater than theory indicated. But both with a battery current and with that from a Clarke magneto-electric machine, it was considerably less. The author, seeking an explanation, regards as untenable the general views regarding passage of currents through liquid conductors, the phenomena of passage from the solid to the liquid conductor being generally ignored; and he thinks the facts favour Helmholtz's view, which regards the liquid, with the electrodes immersed in it, as a condenser of very great capacity. Weak currents which cannot pass through the liquid yet produce a polarisation of the electrodes (charge of the condenser). With strong currents the only difference is that as soon as the difference of tension has reached a certain limit (maximum of the electromotive force of polarisation), all newly arriving quantities of electricity can unite through the liquid. M. Colley shows how his results are deducible from the state of things thus supposed.—A number of experiments on electric clocks (with Tiede's pendulum) are described by Dr. Joseph Brunn.—Of the few remaining original papers we note one by M. Chwolson on the theory of interference-phenomena.—A good experiment for illustrating the explosive character of a mixture of oxygen and hydrogen gases is described by M. Rosenfeld.

Archives des Sciences Physiques et Naturelles, Jan. 15.—In the opening paper of this number M. de Candolle inquires into the causes of unequal distribution of rare plants on the Alpine chain (See Nature, vol. xiii. p. 516).—M. Favre follows with a note on the glacial and post-glacial strata of the southern slope of the Alps, in the canton of Tessin and in Lombardy.—M. Pictet discusses the application of the mechanical theory of heat to the study of volatile liquids, and finds some simple relations between the latent heats, atomic weights, and tension of vapours.—A series of meteorological observations from the coast of Labrador, by Moravian missionaries, is communicated by M. Gautier (See Nature, vol. xiii., p. 60).

SOCIETIES AND ACADEMIES

London

Royal Society, May 18.—"On the Organisation of the Fossil Plants of the Coal-measures.—Part VIII. Ferns continued, and Gymnospermous Stems and Seeds." By Prof. W. C. Williamson, F.R.S., Professor of Natural History, Owens College, Manchester.

The author described the stem of a new fern, in which the principal vascular axis formed a cylinder enclosing a medulla, as in some Lepidodendra. This vascular cylinder gives off secondary bundles, to petioles, and rootlets, and each vessel is filled with tylose. Two kinds of Fern-sporangia were described—one Polypodiaceous, with a straight, vertical annulus; the other, with the annulus horizontal and subterminal, exhibits a type seen in the recent Schizeaceæ and Gleicheniaceæ. But the chief subjects of the memoir are the stems and seeds of Gymnosperms. Of the former various modifications of the *Sternbergian Dadoxylons* are described, and shown to correspond very nearly to many recent conifers, though with distinctive features of their own, especially in the structure of their woody fibres, and in the leaf-bundles of some species being given off in pairs. The author still excludes the Sigillariæ from the Gymnospermous group.

The most important novelties are the Gymnospermous seeds, exhibiting their internal organisation, found in France by M. Grand-Eury, and by the author in this country. Of these he describes a number of new genera and species in addition to the Trigonocarpons previously described by Mr. Binney and Dr. Hooker. The most remarkable of these is one designated *Lagenostoma ovoides*, in which a large flask-shaped cavity, inclosed within a crenulated canopy, occupies the apical end o the seed, between the apex of the endosperm and the exostome. Brongniart believed, with reason, that such cavities have originated in the absorption of the apex of the nucleus, leaving the corresponding part of the nucular membrane to form the cavity or "lagenostome." In this lagenostome large pollen-grains are found in many cases. Brongniart designates it the "Cavité pollinique." Examples of several other seeds presenting generic and specific modifications of the same type, as well as several species of the well-known genus Cardiocarpum and of Trigonocarpum. In all these the primary nucleus seems to have been absorbed, being now only represented by the investing nucular membrane. Within this is an inner structureless bag, which, in some of the Cardiocarpa, is filled with parenchyma, and which appears to represent the *secondary* perispermic membrane, or what is really the endospermic membrane, or *primary* embryosac of the Gymnosperms. The intimate structure of Trigonocarpum agrees with Dr. Hooker's description of it so far as the longitudinal sections are concerned, save that here, also, a "cavité pollinique" exists. Transverse sections show that the well-known sandstone casts of Trigonocarpum do not represent the external form of these fruits, but are *casts of the interior* of the hard endotesta. This latter was not trigonous externally, like the common specimens, but had twelve longitudinal ridges, three of which, corresponding with those of the sandstone casts, were more prominent than the rest. The endotesta was invested by a delicate parenchymatous sarcotesta. All these seeds appear to have Cycadean